THE UNIVERSITY OF MICHIGAN
COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS
Computer and Communication Sciences Department

Final Report

AUTOMATON DESIGN, CONSTRUCTION, COMPLEXITY AND ADAPTATION
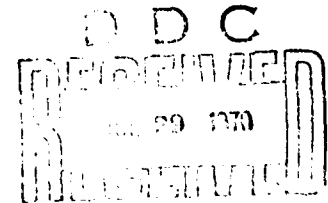
Logic of Computers Group

ORA Project 01487

INTRODUCTION

Research under Contract N00014-67-A-0181-0011 began 1 January 1968

and continued to 31 December 1969.   In the two two years of the

contract, 15 technical reports of research in the field of theory

of automata and related computer areas were submitted to the Office

of Naval Research. The principal reports and publications resulting

from the research are listed and a listing of the scientific personnel

whose ONR supported research led to the obtaining of advanced degrees

at The University of Michigan is given.

A List of the Principal Reports and Publications

1. "Goal Directed Pattern Recognition", J. Holland. paper presented
   at the International Conference on Methodologies of Pattern
   Recognition, Hawaii, 1968.

2. "On the Feedback Complexity of Automata", B. P. Zeigler, Technical
   Report, January 1969. (This report also served as a University
   of Michigan doctoral thesis.)

3. "A Self-Describing Axiomatic System as a Suggested Basis for a
   Class of Adaptive Theorem Proving Machines", T. Westerdale, Technical
   Report, March 1969. (This report also served as a University
   of Michigan doctoral thesis.)

4. "On Minimum Walks in Graphs", Naval Research Logistics Quarterly,
   15, 3, Hedetniemi, Stephen, September 1968, 453-458.

5. "Adaptive Plans Optimal for Payoff-Only Environments", J. Holland,
   Technical Report, May 1969.

   Also: presented as a paper at the Second Hawaii International
   Conference on Systems. (1969). This paper appears on pp. 917-920
   of the Proceedings of the Conference.

6. "A Neural Subassembly Model of Human Learning and Memory", J. Sampson,
   Technical Report, June 1969. (This report also served as a
   University of Michigan doctoral thesis.)

7. "Formalisms for Living Systems (Part I)" R. Laing, Technical
   Report, January 1969.

8. "Von Neumann's Self-Reproducing Automata", A. W. Burks, Technical
   Report, June 1969.

   Also: to appear in Essays on Cellular Automata, University of
   Illinois Press.

9. "A Proof Technique in Graph Theory", S. Hedetniemi and D. Geller,
   in Proof Techniques in Graph Theory, (ed. F. Harary), Academic Press.

10. "Connectivity in Digraphs", D. Geller, Technical Report, July 1969.

11. "A New Kind of Turnpike Theorem", J. Holland, Bulletin of the American Mathematical Society, 75, November 1969, 1311-1317.

12. "Computer Simulation of a Living Cell: Multilevel Control Systems", R. Weinberg and B. Zeigler. Presented at the American Society for Cybernetics Third Annual Symposium on Cybernetics, (Gaithersburg, Maryland, October 1969). Submitted to J. Am. Soc. of Cybernetics.

13. "A Least Upper Bound on the Feedback Indegree for Homomorphic Realization of Sequential Machines", B. Zeigler, Technical Report. October 1969.

14. "A Note on Series Parallel Irreducibility", B. Zeigler, Technical Report. October 1969.

15. "System Theoretic Analysis of Models: Computer Simulation of a Living Cell" B. Zeigler and R. Weinberg. Technical Report, November 1969. Revised version accepted by J. Theoretical Biology.

The following persons who received the doctorate in
Computer and Communication Sciences at The University of
Michigan, received Office of Naval Research support for
their thesis research.

Bernard P. Zeigler

Jeffrey D. Sampson

Thomas H. Westerdale